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EXPERIMENTAL FISHING TRIP TO BERING SEA

By Joseph E. King*

INTRODUCTION

The motor vessel Alaska, property of the Reconstruction Finance Corporation and operated by the Pacific Exploration Company, left Astoria, Oregon, on July 21, 1947, to fish for king crabs in Bering Sea. Aboard were 13 men: the master of the vessel, a chief engineer, an assistant engineer, a cook, six fishermen, a representative of the International Fisheries Commission, a cannery technician from a commercial West Coast packer, and the author who served as observer for the Fish and Wildlife Service.

THE ALASKA TIED UP AT THE DOCK AT FALSE PASS, ALASKA

The objectives of the trip were several. The crew's chief aim, of course, was to make a profitable trip in as short a time as possible and return to the home port. The International Fisheries Commission desired to learn more of the size, movements, distribution, and abundance of halibut in Bering Sea and had an agreement with the Pacific Exploration Company whereby all live halibut taken incidental to crab fishing operations were to be tagged and released by a representative of the Commission. The Fish and Wildlife Service hoped to supplement the information gained earlier by the studies[1/] of the Alaska Crab Investigation pertaining to the size, distribution, and abundance of the king crab and bottom fish in Bering Sea. All the above groups were interested in determining whether or not a vessel of the type and size of the Alaska could operate satisfactorily and with profit in Bering Sea.

A condensed log of the trip follows:

Left Astoria, July 21; arrived south side of Alaska Peninsula, July 27; made three test drags, then proceeded through Unimak Pass to Bering Sea; en-

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1/"The Alaskan King Crab," Fishery Market News, May 1942 - Supplement, Vol. 4, No. 5a, U. S. Fish and Wildlife Service.

Note: This article, without the appendix, appeared in the January 1949 issue of Commercial Fisheries Review.

gaged in trawling in Bering Sea from August 1 to September 5; made twelve additional drags on the south side of the Aleutian Peninsula; vessel then departed for Astoria, arriving September 16.

THE VESSEL

DESCRIPTION:

General type of vessel	trawler
Over-all length	100 feet
Beam	25 feet
Draft	13½ feet
Main engine	supercharged diesel, delivering 600 hp. at 400 RPM
Auxiliary engines	2 diesels, 75 hp., each with power take-off for driving trawling winch, and each driving a 220 v. generator
Trawling winch	having two main spools each with a capacity of 500 fathoms of 5/8-inch cable (on this trip the vessel carried 450 fathoms on each spool)
Fuel capacity	17,700 gallons
Lubricating oil capacity	1,200 gallons
Fresh water capacity	2,240 gallons

As crab legs are very light and bulky, the vessel was never carrying sufficient weight to be properly trimmed. In all other respects, the Alaska was quite seaworthy and performed very well in heavy seas whether going into the wind or before the wind.

MISCELLANEOUS EQUIPMENT ABOARD THE VESSEL:

1 - Radio-telephone, 65 watt
1 - Radio-direction finder
1 - Sonic depth finder, non-recording type

A 125- or 150-watt radio-telephone would have been much more satisfactory than the 65-watt set. On many occasions, perhaps due to atmospheric conditions, the operator could not contact shore stations or other vessels within 150-200 miles.

The radio-direction finder was of little value when fishing in the eastern Bering Sea area, as the Alaska was beyond the accurate range of the beacons which serve that region. Within 100 miles of the beacons, however, it was very useful.

The fishing would have been greatly handicapped without a sonic depth finder. The one aboard the vessel operated very well in good weather but did not function properly when the vessel was heaving and pounding in rough seas. Rolling did not throw the instrument off as much as pitching.

DESCRIPTION OF TRAWLS USED:

Type of trawl	Eastern or North Atlantic
Number of new trawls at start of trip	6

Number of unused trawls at finish	2
Trawls completely torn up	1
Trawls in fair shape at finish	3
Foot rope	118 feet in length, 5/8-inch cable
Head rope	95 feet in length, 3/8-inch cable
Splitting strap	1/2-inch cable
Dandylines	17 fathoms in length, 1/2-inch cable
Buoyancy floats	steel, 7 inches, 19 to 20 in number
Bag rings	3 inches, galvanized
Twine in body of net	No. 60 medium lay cotton
Cod end	9 thread sisal, held together with hog rings
Mesh sizes (stretched mesh):	
Wings, square and belly of net	6 inches
Intermediate bag	$4\frac{1}{2}$ "
Cod end of net	5 "
Trawl doors	about 700 pounds each, 4 x $7\frac{1}{2}$ feet

The trawls used functioned quite satisfactorily when towed at the proper speed and under normal weather conditions. When the sea became exceptionally rough, the catch would drop off. It was assumed that the net was not hugging the bottom and fishing properly.

The normal towing speed was 2 to 3 knots with the main engine at 200 to 220 RPM. If the rate were increased to 260 RPM, the net would not remain on the bottom.

THE REFRIGERATION SYSTEM:

2 compressors, 2-cylinder, vertical type, size 5" x 5". Driven by 2 motors, 20 hp., 220 v., 60 cy., 3 phase.
1 pump, cooling with ammonia.
2 pumps, vertical centrifugal, for brine agitation.
2 tanks, for sharp freezing, each of approximately 1,100 cubic feet of space and located about midway on port and starboard sides of the vessel. Each tank containing 582 feet of $1\frac{1}{4}$" ammonia refrigeration coils on walls, and 2,660 feet of $1\frac{1}{4}$" shelf coils.
1 hold, main or forward, containing approximately 14,735 cubic feet of space and 2,212 feet of $1\frac{1}{4}$" ammonia refrigeration coils.
1 hold, aft, of approximately 12,500 cubic feet of space and containing 1,892 feet of $1\frac{1}{4}$" ammonia refrigeration coils.

CRAB COOKING EQUIPMENT:

1 Steam generator, approximately 3-4 hp. capacity.
1 Cooking tank of 3/8" steel insulated with $1\frac{1}{2}$" wood planking. Cover in four sections of $1\frac{1}{2}$" plank. Inside dimensions of tank--94" long x $35\frac{1}{2}$" wide x 38" deep. Bottom of tank contains about 63 feet of $1\frac{1}{4}$" steam piping.

AREAS FISHED AND GENERAL RESULTS

Most of the fishing of the Alaska was performed in an area about 50 miles in length (SW-NE) lying 30 to 60 miles offshore between Port Moller and Black Hills, in the outer portion of Bristol Bay. This was one of the areas explored by the Alaska Crab Investigation in 1941. Upon leaving Bering Sea after 36 days of fishing, the vessel had a total catch of 14,172 crabs (approximately 50,000 pounds of crab legs), for an average of 107 crabs per drag. The bulk of the catch came from the general area indicated above and shown in Figure 1. The prospecting done in

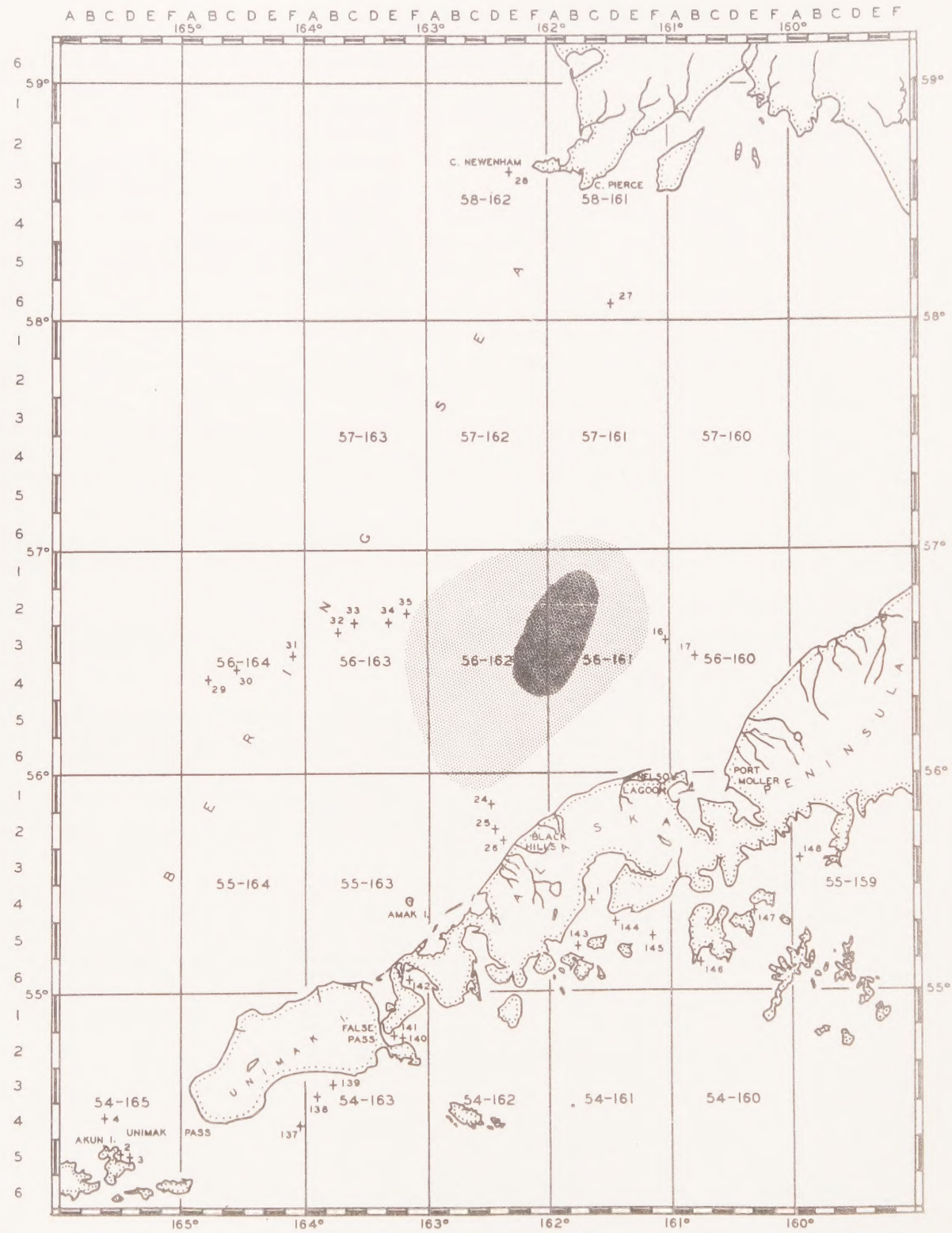


FIGURE 1 - FISHING OF THE ALASKA WAS PERFORMED IN AN AREA ABOUT 50 MILES IN LENGTH (SW-NE) LYING 30 TO 60 MILES OFFSHORE BETWEEN PORT MOLLER AND BLACK HILLS, IN THE OUTER PORTION OF BRISTOL BAY.

Bering Sea outside this area and on the south side of the Peninsula accounted for a very small percent of the catch and was quite unprofitable fishing. Table 1 presents the catch of crabs and major fish. While the numbers given for crabs

Table 1 - Catch of Crabs, Halibut, Cod, Pollock, and Flounders

Area	Crabs				Cod	Pollock	Halibut		Other Flounders
	Males	Females	Total	Average per hrs. fishing			Med. 1/	Small 2/	
	No.	No.	No.		Lbs.	Lbs.	No.	No.	Lbs.
Bering Sea	13,332	840	14,172	52.9	42,800	37,925	98	336	98,285
South Side of Peninsula	37	7	44	2.4	2,560	135	46	271	6,925
Total	13,369	847	14,216	47.7	45,360	38,060	144	607	105,210

1/Fish 10 pounds and over (heads off).
2/Fish under 10 pounds, including legal-sized chickens (5 to 10 pounds) and babies less than legal size (under 5 pounds).

and halibut are actual counts, the poundages for the balance of the catch are estimates based on the concensus of opinion of several members of the crew.

The entire catch was taken by trawling. No tangle nets or other types of gear were used.

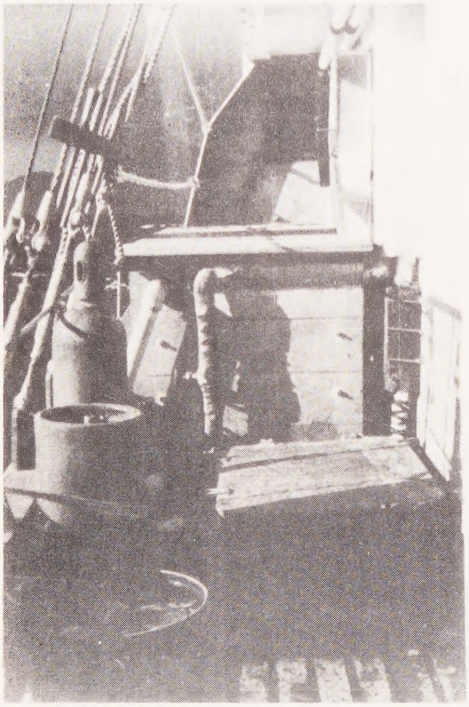
The apparent scarcity of halibut in Bering Sea was disappointing, both to members of the crew and to the International Fisheries Commission, but the vessel may not have been operating on the most abundant grounds. As indicated by the length frequency distributions of the 434 halibut taken in Bering Sea and the 317 from the south side of the Peninsula, the average lengths of these fish are considerably less than those normally taken by the commercial fishery. As most of these fish were alive when brought aboard, those over 65 cm. total length were tagged and released while the smaller fish were measured and released without tagging. Not more than a dozen halibut classed as medium-size by market standards were frozen during the entire trip. The catch of baby halibut (under 5 pounds) was a very significant part of the catch. According to the International Fisheries Commission, of the 317 fish taken on the south side of the Peninsula, 72 percent by number were under 5 pounds, and that of 434 halibut taken in the Bering Sea proper, 44 percent were under 5 pounds.

LOOKING FORWARD ON THE ALASKA; BUTCHERING TABLE IN THE FOREGROUND BEARING TWO BUTCHERING KNIVES, TRAWLING WINCH LOCATED JUST BEYOND; IN THE PORT-SIDE WALKWAY THE OPENING TO THE SHARP FREEZER CHAMBER, THE COOKING TANK, AND THE COMPARTMENT HOUSING THE STEAM GENERATOR.

The other species of bottom fish taken in Bering Sea were mainly the yellowfin sole (Limanda aspera), cod (Gadus macrocephalus), Alaska pollock (Theragra chalcogramma), and rock sole (Lepidopsetta bilineata). The flathead sole (Hippoglossoides elassodon), arrow-toothed flounder (Atheresthes stomias), and lemon

sole (Pleuronectes quadrituberculatus) were taken in lesser abundance. During the limited work south of the Alaska Peninsula, a higher proportion of flathead, lemon, and sand sole, and a lower proportion of the yellowfin sole, cod, and pollock were found.

Most of the yellowfin sole taken in Bering Sea and south of the Peninsula were thin-bodied fish and below the size desired for filleting by the present market at Seattle. The flathead sole taken in Bering Sea were also small and comprised a smaller portion of the catch than south of the Peninsula. In the latter area, many of the flathead sole were of marketable size, and in some locations, appeared to be the most abundant flat fish. The lemon sole taken were a thick-bodied fish but did not constitute a substantial portion of the catch in either locality. Flounders (Platichthys stellatus) were taken south of the Peninsula but none were encountered in the area of operations in Bering Sea. The majority of the rock sole taken in Bering Sea were small in size. This species constituted only a minor portion of the catch in the few drags made on the south side.



NEARER VIEW OF PORT-SIDE ARRANGEMENT SHOWING ENTRANCE TO SHARP FREEZE CHAMBER, COOKING TANK, AND STEAM GENERATOR COMPARTMENT ON ALASKA.

The pollock accounted for a substantial portion of the catches in the deeper waters of Bering Sea and may have commercial possibilities.

During the course of the trip, between 90 and 100 tons of cod, pollock, and flounders were discarded. The demand for these fish at the time was such that it did not pay the fishermen to spend valuable time in dressing and freezing them. A great amount of work had to be expended, however, in clearing the decks of this waste.

It has been suggested that in operations where the chief objective is to catch crabs, some modification of gear, such as cutting back the head rope and enlarging the mesh size, might be employed, which would increase the escapement of these presently undesired fish. It is quite possible, however, that at some future time, the economic factors of supply, demand, and cost of production, which greatly influence the development of a fishery, may be changed so as to encourage the utilization of these fish.

It is recognized that the statements above pertaining to the relative size and abundance of crabs and fish are based largely upon observations made in a limited period of time and area. They represent conditions, however, as found in that portion of the Bering Sea at that time of year. As the major fishing effort of the Alaska was concentrated in a relatively small area lying off the Black Hills and chiefly at depths from 30 to 50 fathoms, it was certainly possible that large concentrations of both crabs and fish may have been missed. In view of the fact that the Alaska was being operated on a test commercial basis, it was not feasible to spend considerable time in pure exploration. Therefore, after a few exploratory

drags, the remainder of the time was spent on the grounds which were found to provide the most profitable fishing. This particular area was described in the Service's report, "The Alaskan King Crab," as being one of the richest grounds located during that investigation. This agreed also with the experiences of the other crab fishing enterprises which were conducted in Bering Sea in the summers of 1946 and 1947. Also, the Alaska and the other vessels were operating in the area at the time of year recommended by the Alaska Crab Investigation, and all have reported generally similar experiences.

MISCELLANEOUS BIOLOGICAL OBSERVATIONS

THE KING CRAB: Very young king crabs were taken in only one drag. This was made close to the beach in 18-21 fathoms and netted 5,000 to 10,000 young of 2.5 to 3.5 cm. in carapace width. The width and length measurements were nearly identical in most of those measured. The sexes were apparently of equal numbers and similar in size.

In another drag made offshore in Bering Sea at a depth of 37 to 47 fathoms, the catch included 40 large male crabs and about 100 small males and females of 2½ to 3 inches carapace width. None of the small females were carrying eggs. Crabs of this size were not encountered in the deeper offshore waters. In four other drags, at depths from 26 to 37 fathoms, the sex ratio was about equal and, in many cases, the females were in the majority. At depths from 38 to 40 fathoms, the catch was nearly all males, a desirable feature from a commercial viewpoint.

All females of adult size taken during the expedition were carrying eggs. No individuals of either sex were observed in a stage indicating a recent molt or an approaching molt.

The females were one-third to one-half smaller in weight and size than the males. The crabs taken south of the Peninsula were definitely larger than those from Bering Sea.

A CREW MEMBER HOLDING A SPECIMEN OF A KING CRAB.

A great number of crab stomachs were examined and found to be either empty or containing a small amount of material difficult for analysis. The animal's mandibles and gastric mill are exceedingly efficient. The most frequently identified objects among the stomach contents were fragments of brittle stars, and small clam shells, scale worms, pieces of sponge, and body parts of other small crabs.

According to the work of Marukawa,[2/] three species of king crabs occur in the cold waters of the northern Pacific, Paralithodes camtschatica, P. platypus and P. brevipes. Only P. camtschatica was included in the catches of the Alaska, as far as could be determined.

2/Marukawa, Hesatoshi. 1933. Biology and fishery research on Japanese King Crab, Paralithodes camtschatica (Tilesius). Jour. Imperial Fisheries Experimental Station, No. 3, March. Tokyo.

FEEDING HABITS OF SOME OF THE COMMON FISH

No attempt was made to analyze stomach contents on a quantitative basis but whenever time was available, fish of different species were examined. For example: rock sole--found to contain sea cucumbers, echiuroid worms, and scale worms; yellowfin sole--contained small clams and amphipods; cod--an omnivorous fish, contained remains of such other fish as flounders, sea poachers, herring, pollock, etc., also crabs, shrimp, and tunicates; pollock--those examined contained mostly shrimp and a few small fish.

CRAB BUTCHERING AND PROCESSING

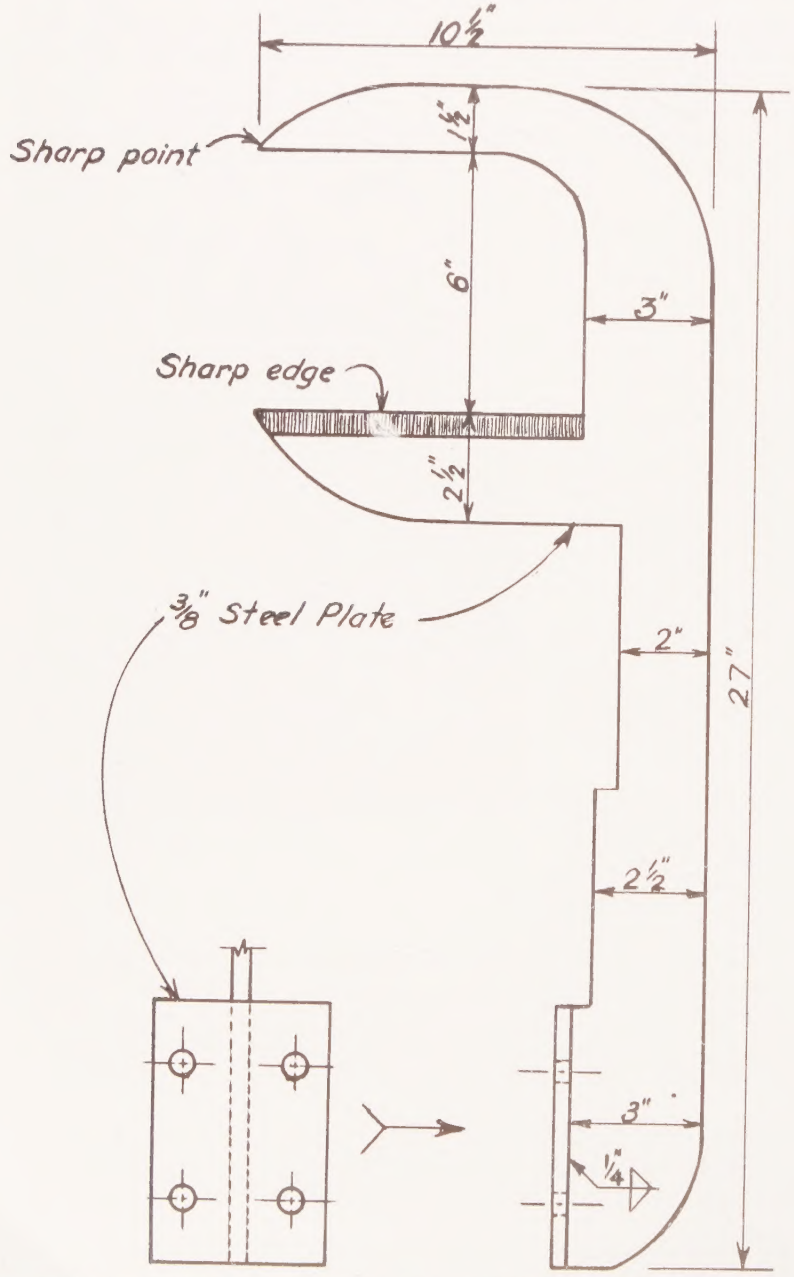


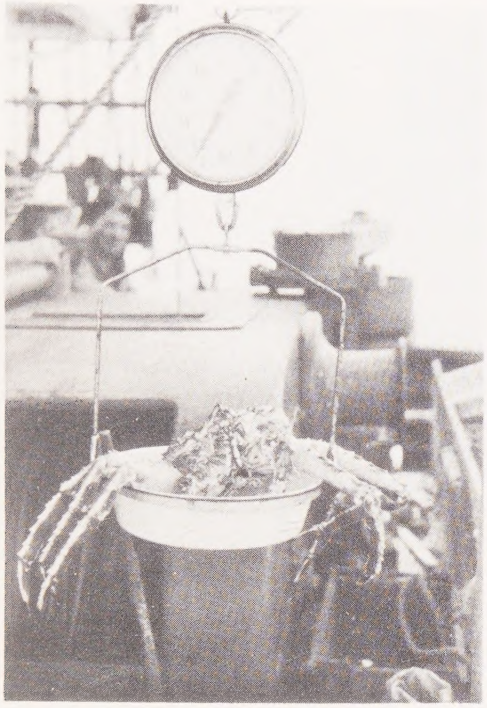
FIGURE 2 - DRAWING OF THE TOOL OR KNIFE USED IN BUTCHERING THE CRABS.

When the contents of the bag were dumped on deck at the end of each drag, the crabs were picked out and thrown onto the butchering table which was actually the raised hatch cover of the main hold. The carapace was removed by hand with the assistance of the butchering tool shown in Figure 2. The ventral part of the body was broken in the mid-line over the sharp edge of this tool and the remaining gills and other undesirable material were cleaned from the bases of the legs. The legs were then washed and stacked in wire baskets until enough were collected for a cook (about 200, depending on size). The average rate of butchering was about 53 crabs per man per hour.

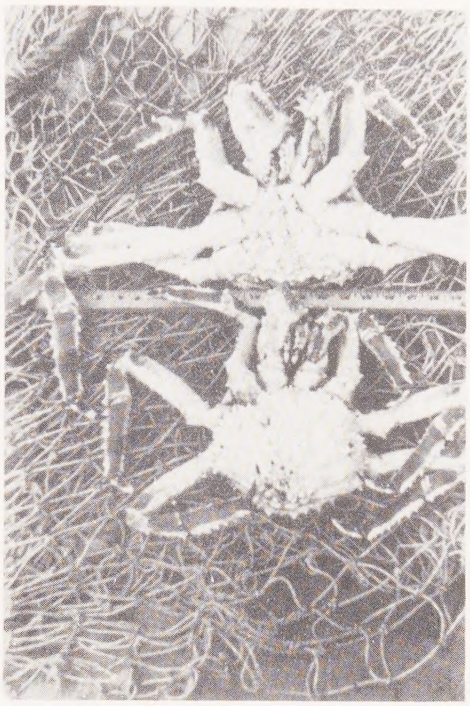
The crabs were cooked in boiling sea water for 17 minutes, quickly cooled by running sea water through the tank for 20 minutes, then removed by hand and replaced in wire-mesh baskets (31½" x 17½" x 4"). The capacity of each snarp freezer was about 60 baskets holding the legs of 600 crabs. About one-half hour was required to

load each freezer. The temperature of the freezer varied from -12° F. to -4° F. and the crabs were usually left in the freezer about 12 hours.

At the end of this time, the baskets were passed into the forward cold storage room where the crab legs were glazed by dipping the baskets twice in fresh water. The legs were then stowed in side bins and at intervals during the trip were sprinkled



AN ABOVE-AVERAGE SIZE MALE KING CRAB.



MALE KING CRAB ABOVE WITH TRIANGULAR-SHAPED ABDOMEN; FEMALE BELOW WITH BROAD FAN-SHAPED ABDOMEN.

with water to maintain a heavy glaze. The temperature of the cold storage holds remained at 10° F. to 12° F. At the end of the trip, the catch appeared to be in excellent condition.

On August 8, for experimental purposes, 28 crabs were weighed, cooked in the whole state, weighed again, butchered, and then the legs weighed. The live weight was 305.55 pounds, the final butchered weight 150.25 pounds, thus indicating a 51 percent loss in weight resulting from the cooking and butchering processes.

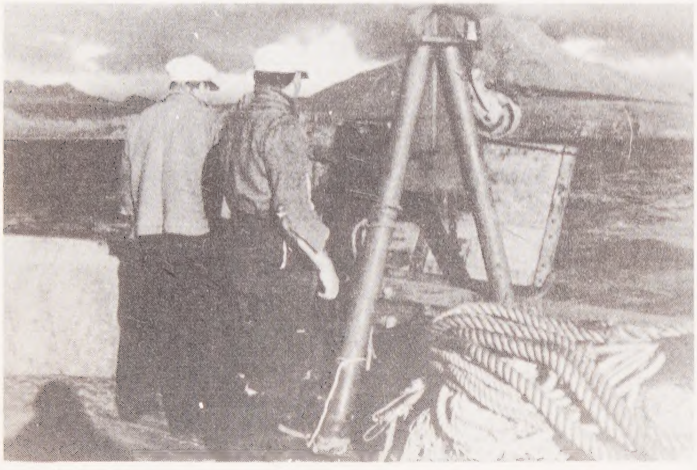
OPERATING PROCEDURE OF CRAB COOKING EQUIPMENT

Steam was generated in boiler until 75 pounds of pressure was reached, which required about 10 minutes. Steam was then turned into pipes in the cooking tank, at which time pressure immediately dropped to 25 pounds where it remained during the cooking process. About 2 to 2½ hours were required to heat the water to boiling. The tank was usually about two-thirds full of boiling water when the crabs were introduced. Capacity of tank was about 200 crabs, depending on their size.

The water would not stay in the tank in rough weather even with the tank cover in place. On a few occasions, the person loading the tank with crabs received minor

burns from boiling water splashing out of the tank. At times, it was necessary to heat two or more tankfuls of water in order to have enough remaining to cook the crabs. The cooking procedure might have been rendered less hazardous by the use of a closed retort rather than an open tank.

SUITABILITY OF VESSEL FOR FISHING OPERATION



TRAWL DOOR BEING FASTENED IN PLACE AT END OF DRAG ABOARD ALASKA.

The Alaska is a combination-type vessel readily adaptable to trawling, purse-seining, or live-bait tuna fishing. As a trawler, she was rigged to operate with a "stern set" type of gear. In making a set, the net was put out over the stern rather than from the side as in the North Atlantic draggers.

During conditions of very bad weather, such as was experienced in the latter part of August, the vessel did not prove nearly as satisfactory as an Atlantic-type dragger, the Deep Sea, which was also fishing for king crabs in the same locality. On several occasions when the Alaska was at anchor because of bad weather, the Deep Sea was fishing nearby and doing quite well. The difference being, mainly, that on the latter vessel, the men handled the gear amidship, protected from following seas by the wheel house astern; also with the "side set" type of operation the entire net is not hauled aboard after each drag and, what is probably more important, the bag does not swing pendulum-like from a high boom when it is being lifted aboard. Some of the men barely escaped injury on several occasions when trying to get the bag aboard and dumped during rough weather. With no protection astern, high seas sometimes came aboard adding to the difficulties.

THE ENTIRE NET WAS TAKEN ON BOARD AT THE END OF EACH DRAG AND LAID-OUT ON THE STERN IN PREPARATION FOR THE NEXT DRAG.

During the first week in September, weather conditions became such that even the Deep Sea had to stop fishing. When weather permitted, however, the Alaska, with her type of gear, seemed to take just as many crabs per drag as the other vessel.

There is considerable question as to whether or not vessels of this size, 100 feet and 130 feet, can profitably engage in the Bering Sea king crab fishery as a year-around enterprise. It is generally conceded that after October 1, weather conditions in Bering

Sea are such that if fishing is attempted, much time will be wasted regardless of type of gear, and that in the event of a severe storm there is no adequate shelter.

HAZARDS TO FISHING ENCOUNTERED IN BERING SEA

NEED FOR NAVIGATIONAL AIDS: The most profitable fishing area, as found in the month of August, was 275 to 300 miles from the St. Paul marine radio beacon and about 175 miles from the Cape Sarichef station. As the accurate range of

THE TIE-ROPE IS JERKED AND THE BAG EMPTIED. SHOWING THE TYPICAL CATCH OF COD, POLLOCK, AND A FEW CRABS.

HOLDING THE NET CLEAR AS THE BAG IS DUMPED.

these stations is only 100 miles, they were of little value in determining the vessel's position. If a more active fishery should develop with more vessels using these waters, there would be a definite need for radio beacons nearer the fishing grounds.

Because of the almost continual fog in late summer, land is seldom sighted. Also, the drift due to strong tidal currents is considerable. As a result of these factors, vessels must depend upon sonic devices, loran, or radio fixes in addition to dead reckoning.

LACK OF PORT FACILITIES: The only port on the Bering Sea side of the Peninsula within a reasonable running distance of the fishing grounds tested is Port Moller. This port is reached through a shallow channel which, at present, is bucyed only by the local fishermen each season. The captain states that it is hazardous for a boat to be at the cannery dock when a strong southwest or southeast wind is blowing. Although adequate for the existing salmon fishery, if a substantial offshore fishery

HOISTING THE BAG ABOARD. COWHIDE "CHAFING GEAR" WAS USED TO PROTECT THE BAG FROM ABRASION.

should develop in the area, additional docking space and facilities would be necessary.

IMPEDIMENTS TO TRAWLING: The area tested has, in general, a very good bottom for trawling. The bottom material is of grey volcanic sand or ash, with occasional patches of mud. On four of the drags, snags were encountered, probably rocks, which resulted in bad tears in the net and loss of at least part of the catch. In two other drags, tons of a peat-like material were picked up in such mass that the net could not be lifted aboard the vessel. On 16 drags, dense colonies of a stalked ascidian were encountered which, in some instances, completely clogged the net and greatly interferred with its effectiveness. During two other drags, several thousand pounds of sponges having a very foul odor were picked up and it was quite a chore to dispose of them.

OTHER OBSERVATIONS ON WEATHER CONDITIONS: During the first two weeks of August, fine fishing weather was experienced in Bering Sea. There was some fog every day, and light rain on frequent occasions, but the sea was relatively calm. In the latter part of August and the first week in September, there were several strong blows reaching gale proportions. Hail and snow fell a few times and it appeared that winter had arrived. The more severe storms were accompanied by winds from the southwest or northwest. On August 31, during a heavy southwester, the anchor line parted resulting in the loss of the vessel's only sea anchor.

While in Bering Sea and the North Pacific, air temperatures were recorded three times daily: in the early morning, noon, and late afternoon. In Bering Sea, during the period August 1 to September 5, the minimum recorded was 43° F., the maximum 64° F., with the average for the period being 51° F.

CRAB BUTCHERING IN PROGRESS AT RIGHT. THE MEN ON THE LEFT ARE CLEANING GILLS AND OTHER ORGANS FROM THE BASES OF THE LEGS. IN THE BACKGROUND, MAN IS PICKING CRAB MEAT.

IN SUMMARY:

Period spent in Bering Sea	-- August 1 - September 5
Total number of days	-- 36

Days on which sun shone at least part of time	-- 10
Days on which rain fell	-- 20
Number of days spent in port	-- $4\frac{1}{2}$
Fishing time lost due to bad weather--hours	-- 105

BOTTOM TEMPERATURES: At intervals, when conditions permitted, the temperature of the water near the bottom was obtained by means of a reversing thermometer. In general, the lowest temperatures were found in the deepest waters, which was to be expected. On the best crab fishing area, the bottom temperatures ranged from 3° C. to 4° C. The best drag, yielding 502 crabs, was made in water of 41-45 fathoms with a bottom temperature of 3.01° C. Crabs were taken from waters with bottom temperatures ranging from 1.65° C. to 7.25° C. Air and water surface temperatures were taken at each station where the bottom temperature was obtained.

A P P E N D I X

Table 1 - Data Recorded for each Drag Made in Bering Sea and South of the Peninsula

Date	Drag No.	Area*	Starting Pt. Lat.	Starting Pt. Long.	Course	Tide	Current Set	Depth Fathoms	Bottom	Time on Bottom Minutes	Locality
						BERING SEA					
Aug. 1	4	54-165,4C	54°30'	165°35'	NNE	Ebb	NE-SW	64-48-82	gyS	98	10 M. N.of Akun Island
2	5	56-163,5F	56°18'	163°05'	NE	"	"	45	"	135	45 " NW of Black Hills
2	6	56-162,4A	56°20'	162°55'	NE	Slack-Flood	SW-NE	45	"	150	" " " " " "
2	7	56-162,4A	56°22'	162°51'	NE	Flood	"	43	"	175	" " " " " "
2	8	56-162,4B	56°24'	162°42'	NE	"	"	40	gySM	165	" " NNW " " "
2	9	56-162,4C	56°27'	162°32'	NE	"	"	41-39	gyS	170	" " " " " "
3	10	56-162,3D	56°32'	162°23'	NE	Slack	---	36	"	160	" " " " " "
3	11	56-162,3E	56°33'	162°17'	NE	Flood	SW-NE	37	"	145	50 " N. of " "
3	12	56-162,3F	56°36'	162°05'	NE	"	"	40	gySM	145	" " " " " "
3	13	56-161,3A	56°37'	161°52'	NExE	Ebb	NE-SW	45-41	"	135	" " " " " "
3	14	56-161,3B	56°37'	160°42'	NExE	"	"	38-40	"	100	55 " NNE " " "
3	15	56-161,3D	56°35'	161°22'	E	Slack-Flood	SW-NE	37	gyS	125	35 " NNW of Nelson Lagoon
4	16	56-161,3F	56°36'	161°02'	NE	Slack	---	37	"	160	" " N. " " "
4	17	56-160,3B	56°32'	160°47'	SE	Flood	SW-NE	34-32	"	105	30 " NNE " " "
4	18	56-161,5A	56°17'	161°57'	SW	Ebb	NE-SW	40-47	"	115	" " N. of Black Hills
4	19	56-162,5E	56°13'	162°14'	SWxW	Slack	"	46-42	"	105	" " " " " "
4	20	56-162,5D	56°11'	162°25'	SWxW	Flood	SW-NE	42	"	120	" " " " " "
5	21	56-162,6B	56°05'	162°41'	SW	Ebb	NE-SW	42	"	135	" " NW " " "
5	22	56-162,6A	56°01'	162°51'	SW	Slack-Flood	SW-NE	42-46	"	100	35 " " " " "
5	23	55-162,1C	55°58'	162°37'	NE	Flood	"	43	"	70	25 " " " " "
5	24	55-162,1D	55°52'	162°28'	SSW	Ebb	NE-SW	38-36	"	75	20 " WNW " " "
5	25	55-162,2D	55°14'	162°28'	SWxS	Ebb-Slack	"	26	"	105	15 " W. " " "
5	26	55-162,2D	55°42'	162°24'	MNE	Slack-Flood	SW-NE	18-21	ssh	60	10 " " " " "
7	27	58-161,6D	58°05'	161°28'	NWxN	Slack	---	25-24	gyS	140	30 " S. of Cape Pierce
7	28	58-162,3E	58°38'	162°18'	NW	Flood	SW-NE	28-25	SG	90	8 " W. of Cape Newenham
8	29	56-164,4B	56°25'	164°48'	SW	Slack-Flood	"	47	GSh	125	90 " N. Unimak Island
8	30	56-164,4C	56°28'	164°36'	NE	Flood	"	48	gmMS	105	90 " " " "
8	31	56-164,3F	56°33'	164°08'	NE	Ebb	NE-SW	47	gyS	60	90 " " " "
8	32	56-163,3B	56°38'	163°44'	NE	"	"	45-46	gySG	80	90 " " " "
8	33	56-163,2C	56°42'	163°37'	NE	Slack	---	45	gyS	100	90 " " " "
8	34	56-163,2E	56°42'	163°19'	NE	Flood	SW-NE	44-42	"	90	75 " " of Amak Island
8	35	56-163,2F	56°43'	163°09'	NE	"	"	42	"	90	75 " " " " "
9	36	56-163,2F	56°42'	163°02'	NE	Ebb	NE-SW	43-42	"	120	65 " NNW of Black Hills
9	37	56-162,2A	56°45'	162°52'	NE	"	"	42	"	100	" " " " " "
9	38	56-162,2B	56°49'	162°42'	NE	Slack-Flood	SW-NE	39	"	105	" " " " " "
9	39	56-162,1C	56°52'	162°32'	NE	Flood	"	39	"	85	70 " N. " " "
9	40	56-162,1D	56°54'	162°25'	NE	"	"	39	"	85	" " " " " "
9	41	56-162,1E	56°55'	162°15'	NE	Ebb	NE-SW	41-45	"	120	" " " " " "
10	42	56-162,1F	56°55'	162°05'	NE	Ebb-Slack	"	44	"	100	" " " " " "
10	43	56-162,1E	56°55'	162°15'	SW	Flood	SW-NE	43-40	"	115	" " " " " "
10	44	56-162,1E	56°55'	162°15'	WxS	"	"	45-40	"	95	" " " " " "
11	45	56-162,1E	56°55'	162°15'	SW	Ebb-Slack	NE-SW	42	gySM	90	" " " " " "
11	46	56-162,1E	56°55'	162°15'	SW	Flood	SW-NE	44-41	"	115	" " " " " "
11	47	56-162,1F	56°55'	162°05'	NE	Flood-Slack	"	41-45	gyS	95	" " " " " "
11	48	56-162,1F	56°55'	162°05'	NE	Ebb	NE-SW	42	"	105	" " " " " "
12	49	56-162,1F	56°55'	162°05'	NE	"	"	42	gySM	135	" " " " " "
12	50	56-161,1A	56°55'	161°55'	ENE	"	"	43-45	"	150	" " " " " "
12	51	56-161,1A	56°55'	161°55'	SW	Slack-Flood	SW-NE	44	"	115	" " " " " "
12	52	56-161,1A	56°55'	161°55'	SWxS	Flood	"	44	"	120	" " " " " "
12	53	56-161,1A	56°55'	161°55'	SWxW	Slack-Ebb	NE-SW	44	"	130	" " " " " "
12	54	56-161,1A	56°55'	161°55'	ENE	Ebb	"	46	"	80	" " " " " "
13	55	56-161,1C	56°55'	161°35'	ENE	Slack-Ebb	"	44-41	"	125	75 " NNW " " "
13	56	56-161,1C	56°55'	161°35'	ENE	Ebb	"	44	gyS	170	" " " " " "
13	57	56-161, C	56°55'	161°35'	WSW	Slack-Flood	SW-NE	44-41	gySM	115	" " " " " "
13	58	56-161,1C	56°55'	161°35'	ENE	Flood	"	44-41	"	115	" " " " " "
13	59	56-161,1D	56°55'	161°25'	ENE	Flood-Slack	"	41-38	gyS	125	" " " " " "
13	60	56-161,1C	56°55'	161°35'	SW	Ebb	NE-SW	43-40	"	100	65 " " " " "
14	61	56-161,2B	56°45'	161°45'	NE	Flood	SW-NE	44-38	"	95	" " " " " "
14	62	56-161,2B	56°45'	161°45'	SW	Slack-Ebb	NE-SW	43-64	"	115	" " " " " "
14	63	56-161,2B	56°45'	161°45'	SW	Ebb	"	46	"	120	60 " N. " " "
14	64	56-161,2B	56°45'	161°45'	SW	Slack-Flood	SW-NE	46-37	"	90	" " " " " "
14	65	56-161,2A	56°45'	161°55'	SSW	Flood	"	41-46	gyS	90	" " " " " "
14	66	56-161,2A	56°45'	161°55'	NE	"	"	44-50	"	130	" " " " " "
15	67	56-161,2A	56°45'	161°55'	NE	Slack-Ebb	NE-SW	48-43	"	95	" " " " " "
15	68	56-161,2A	56°45'	161°55'	SW	Ebb	"	45-49	"	120	" " " " " "
15	69	56-162,2F	56°45'	162°05'	SW	Slack-Flood	SW-NE	48-43	"	90	" " " " " "
15	70	56-162,2F	56°45'	162°05'	NE	Flood	"	40-44	"	100	" " " " " "
15	71	56-162,2F	56°45'	162°05'	NE	"	"	44-46	"	115	" " " " " "
16	72	56-162,2F	56°45'	162°05'	NE	"	"	45-47	"	120	" " " " " "
16	73	56-162,2F	56°45'	162°05'	NE	Flood-Slack	"	47-45	"	120	" " " " " "
16	74	56-162,2F	56°45'	162°05'	SW	Ebb	NE-SW	45	"	110	" " " " " "
16	75	56-162,2F	56°45'	162°05'	SW	Ebb-Slack	"	44-42	"	95	" " " " " "
16	76	56-162,2F	56°45'	162°05'	SW	Flood	SW-NE	44-46	"	110	" " " " " "
16	77	56-162,2F	56°45'	162°05'	NE	"	"	44-47	"	95	" " " " " "

* As designated on special chart in use by the Alaska Fishery Investigations; a portion being reproduced in Fig. 1.

Table 1 (Cont.) - Data Recorded for each Drag Made in Bering Sea and South of the Peninsula

Date	Drag No.	Area*	Starting Pt. Lat.	Starting Pt. Long.	Course	Tide	Current Set	Depth Fathoms	Bottom	Time on Bottom Minutes	Locality
						BERING SEA					
Aug. 17	78	56-162,2F	56°45'	162°05'	NE	Flood	SW-NE	45	gyS	120	60 M. N. of Black Hills
17	79	56-162,2F	56°45'	162°05'	NE	"	"	45-47	"	85	" " " " " "
17	80	56-162,2F	56°45'	162°05'	SW-W	Ebb	NE-SW	46-36	"	95	" " " " " "
17	81	56-162,2F	56°45'	162°05'	SW	"	"	44-40	"	100	" " " " " "
17	82	56-162,2F	56°45'	162°05'	SSW	Slack-Flood	SW-NE	44-42	gySM	105	" " " " " "
17	83	56-162,2F	56°45'	162°05'	Circle	Flood	"	42-37	gyS	85	" " " " " "
18	84	56-162,3E	56°35'	162°15'	NW-NE	"	"	45-37	gySM	120	55 " NNW " " "
18	85	56-162,3E	56°35'	162°15'	NE-N	Slack-Ebb	NE-SW	47-44	gyS	155	" " " " " "
19	86	56-162,4D	56°25'	162°25'	SW	Slack-Flood	SW-NE	45-40	"	160	45 " " " " "
19	87	56-162,4D	56°25'	162°25'	NNE	Flood	"	39-44	gySM	130	" " " " " "
19	88	56-162,4D	56°25'	162°25'	SW	Ebb	NE-SW	44-38	"	165	" " " " " "
19	89	56-162,4D	56°25'	162°25'	SW	Ebb-Slack	"	42-44	"	120	" " " " " "
19	90	56-162,4E	56°25'	162°15'	NE	Flood	SW-NE	44	gyS	110	" " N. " " "
20	91	56-162,2F	56°45'	162°05'	SW	Ebb	NE-SW	42-37	"	160	60 " " " " "
20	92	56-162,2F	56°45'	162°05'	NE	Flood	SW-NE	42-46	"	130	" " " " " "
23	93	56-162,4F	56°29'	162°03'	NE	"	"	44-51	"	110	40 " " " " "
23	94	56-161,3A	56°32'	161°55'	NExN	"	"	45-50	"	140	50 " " " " "
23	95	56-161,3B	56°35'	161°48'	W-SW	Slack-Ebb	NE-SW	45-37	"	120	50 " " " " "
23	96	56-161,3A	56°36'	161°59'	SSW-SW	Ebb	"	42-41	"	120	" " " " " "
24	97	56-162,4F	56°25'	162°05'	SW	Slack-Ebb	"	42-36	"	115	40 " " " " "
24	98	56-162,4E	56°25'	162°15'	SW	Ebb	"	44-41	"	150	45 " " " " "
24	99	56-162,4D	56°25'	162°25'	ENE	Slack-Flood	SW-NE	41-37	"	120	45 " NNW " " "
24	100	56-162,4F	56°25'	162°05'	SSW	Slack-Ebb	NE-SW	45-44	gySM	165	40 " " " " "
25	101	56-162,5E	56°15'	162°15'	SSW	Ebb	"	44	"	130	30 " NNW " " "
25	102	56-162,5D	56°15'	162°25'	SSW	"	"	44-42	gyS	140	35 " " " " "
25	103	56-162,5D	56°15'	162°25'	NExN	Slack-Flood	SW-NE	42	"	130	" " " " " "
25	104	56-162,5E	56°15'	162°15'	ENE	Flood	"	43-48	"	120	30 " " " " "
26	105	56-161,4C	56°25'	161°35'	SW	Ebb	NE-SW	45-43	"	120	" " NW " Nelson Lagoon
26	106	56-161,4B	56°25'	161°45'	SW	Ebb-Slack	"	43-41	"	100	35 " " " " "
26	107	56-161,4A	56°25'	161°55'	NExN	Flood	SW-NE	43-42	"	85	40 " " " " "
26	108	56-161,3B	56°35'	161°45'	NE	Flood-Slack	"	41-47	"	105	" " NNW " " "
26	109	56-161,3B	56°35'	161°45'	SW	Ebb	NE-SW	47-42	"	135	" " " " " "
27	110	56-161,3C	56°35'	161°35'	NE	Flood-Slack	SW-NE	44	gySM	150	" " NW " " "
27	111	56-161,3D	56°35'	161°25'	SW	Ebb	NE-SW	44-46	gyS	125	35 " " " " "
27	112	56-161,4C	56°25'	161°35'	SW	"	"	43	"	145	30 " " " " "
27	113	56-161,3D	56°35'	161°25'	NE	Flood	SW-NE	46-44	gySM	175	35 " " " " "
27	114	56-161,3E	56°35'	161°15'	WSW	Slack-Ebb	NE-SW	46-43	gyS	120	" " N. " " "
28	115	56-161,3D	56°35'	161°25'	E	Flood	SW-NE	45-48	"	135	" " NW " " "
28	116	56-161,3E	56°35'	161°15'	E	"	"	47-37	"	105	" " N. " " "
29	117	56-161,4B	56°25'	161°45'	NE-N	"	"	45-47	gySM	150	30 " NW " " "
29	118	56-161,3C	56°35'	161°35'	WxS	Ebb	NE-SW	47-40	"	125	40 " " " " "
29	119	56-161,3B	56°35'	161°45'	WxS	"	"	45-43	"	150	" " " " " "
29	120	56-161,3A	56°35'	161°55'	NExE	Flood	SW-NE	42-44	gyS	145	45 " " " " "
29	121	56-161,3A	56°35'	161°55'	NE	"	"	43	"	135	" " " " " "
30	122	56-161,3B	56°35'	161°45'	SW-NE	Slack-Flood	"	44-42	"	125	40 " NNW " " "
30	123	56-161,3B	56°35'	161°45'	NExN	Flood-Slack	"	42-43	gySM	160	" " " " " "
30	124	56-161,2C	56°45'	161°35'	SW	Ebb	NE-SW	44-40	gyS	125	45 " " " " "
30	125	56-161,2B	56°45'	161°45'	SW	Ebb-Slack	"	44-40	"	160	50 " " " " "
30	126	56-161,3A	56°35'	161°55'	NE	Flood	SW-NE	44-46	"	115	45 " NW " " "
30	127	56-161,2B	56°45'	161°45'	NNE	"	"	46-48	"	125	50 " NNW " " "
31	128	56-161,2C	56°35'	161°35'	SW-NE	Slack-Flood	"	47-49	"	165	45 " " " " "
Sept. 3	129	56-161,3B	56°35'	161°45'	S-SW	Slack-Ebb	NE-SW	40-46	"	155	40 " NW " " "
3	130	56-161,4A	56°25'	161°55'	NE-N	Ebb	"	47-49	"	150	35 " " " " "
4	131	56-161,3A	56°35'	161°55'	SW	"	"	41-43	gySM	150	45 " " " " "
4	132	56-162,4E	56°25'	162°15'	NE	Flood	SW-NE	35-45	gyS	125	25 " N. " " "
4	133	56-162,4F	56°25'	162°05'	NE	"	"	45-50	"	120	" " " " " "
4	134	56-161,3A	56°35'	161°55'	NW	Slack-Ebb	NE-SW	44-42	gySM	135	45 " NW " " "
4	135	56-161,3A	56°35'	161°55'	WSW	Ebb	"	43-40	gyS	155	" " " " " "
4	136	56-162,3F	56°35'	162°05'	SSW	Slack-Flood	SW-NE	44-47	"	150	35 " N. " " "
						SOUTH SIDE OF PENINSULA					
July 29	1	55-161,4C	55°20'	161°40'	NNW	Flood	N	63-53	"	80	Pavlof Bay
31	2	54-165,5C	54°15'	165°30'	NW-SE	"	SE	25-40	"	125	Akun Bay, Akun Island
31	3	54-165,5C	54°15'	165°30'	SE-NW	"	SE	30-48	"	65	" " " "
Sept. 6	137	54-164,4F	54°24'	164°04'	NNE	Ebb		58-51	"	120	Unimak Bight, Off Unimak Is.
6	138	54-163,3A	54°32'	163°46'	N-NE	"		42-20	"	85	" " " " " "
6	139	54-163,3B	54°34'	163°45'	E	Slack-Flood		20-40	"	60	" " " " " "
6	140	54-163,2E	54°46'	163°14'	SW	Flood		51-45	"	75	Ikatan Bay
7	141	54-163,2E	54°48'	163°14'	NE	Ebb		53-48	BkS	60	" "
7	142	55-163,6F	55°05'	163°08'	NNE	Flood		24-19	gnM	70	Morzhovoi Bay
8	143	55-161,5B	55°13'	161°47'	NNE	Flood-Slack		45-62	"	110	Outer Pavlof Bay
8	144	55-161,4D	55°21'	161°28'	ExN	Ebb		42-34	gyS	75	Off Coal Bay
8	145	55-161,5F	55°15'	161°09'	ESE	Slack-Flood		45-42	"	50	Off Jude Island
9	146	55-160,6B	55°03'	160°46'	N-S	Flood		21-21	"	45	Acheredin Bay, Unga Island
9	147	55-160,4D	55°23'	160°22'	WxN	Ebb		105-76	Hd	50	Between Popof & Korovin Is.
9	148	55-159,3A	55°37'	159°57'	NE	Flood		75-45	grMS	40	" Karpa Is. & Fox Bay

*As designated on special chart in use by the Alaska Fishery Investigations; a portion being reproduced in Fig. 1.

Table 2 - Catch for Each Drag, in Actual Numbers of Crabs and Halibut and Estimated Pounds of Cod, Pollock, and Flounders

Drag No.	Catch of Crabs			Pounds Per Hour	Cod	Pollock	Halibut		Other Flounders
	Males	Females	Total				Med.	Small	
				BERING SEA					
4	0	0	0	0.0	200	100	0	3	50
5	30	0	30	13.3	200	200	1	1	1,200
6	50	0	50	18.8	300	150	0	0	500
7	96	0	96	32.9	250	1,200	0	0	1,000
(a) 8	0	0	0	0.0	0	0	0	0	0
9	124	1	125	44.1	300	200	0	1	600
10	99	1	100	37.5	400	500	1	6	1,500
11	38	3	41	17.0	200	300	0	0	600
12	81	7	88	36.4	200	300	0	1	750
13	10	0	10	4.4	300	200	0	0	400
14	48	1	49	29.4	200	300	2	3	1,000
15	26	9	35	16.8	300	200	0	1	500
16	5	10	15	5.6	150	200	1	3	600
17	5	35	40	22.9	1,000	0	2	5	1,200
18	5	0	5	2.6	200	150	0	0	300
19	47	1	48	27.4	400	600	1	0	1,500
20	27	0	27	13.5	500	400	0	1	800
21	23	0	23	10.2	300	250	0	0	800
(b) 22	0	0	0	0.0	0	0	0	0	0
23	8	1	9	7.7	400	300	0	2	900
24	24	1	25	20.0	750	50	0	4	1,100
25	10	9	19	10.9	0	0	4	46	2,500
(c) 26	-	-	-	-	0	0	1	16	200
27	3	4	7	3.0	400	0	0	7	1,000
28	0	0	0	0.0	25	0	0	10	600
29	5	0	5	2.4	100	50	0	1	135
30	2	0	2	1.1	50	50	0	0	100
31	8	0	8	8.0	100	100	0	0	100
32	11	0	11	8.3	400	800	0	0	1,000
33	7	0	7	4.2	400	800	0	0	1,500
34	24	0	24	16.0	400	600	0	0	1,000
35	10	0	10	6.7	400	1,000	0	0	1,200
36	61	0	61	30.5	200	600	0	1	600
37	56	0	56	33.6	400	800	0	1	1,000
38	41	1	42	24.0	300	1,000	0	0	1,200
39	39	1	40	28.2	250	1,000	0	2	1,200
40	44	2	46	32.5	150	50	0	0	300
41	500	2	502	251.0	1,000	1,000	0	1	1,500
42	200	2	202	121.2	300	400	0	0	500
43	372	6	378	197.2	300	500	0	0	600
44	113	4	117	73.9	200	300	0	1	600
45	126	4	130	86.7	300	400	1	0	1,200
46	42	6	48	25.0	200	300	0	0	400
47	64	6	70	44.2	500	800	0	0	1,200
48	119	12	131	74.9	400	600	0	0	1,200
49	81	0	81	36.0	800	1,200	0	0	2,400
50	175	15	190	76.0	800	1,000	0	1	3,000
51	351	18	369	192.5	600	800	0	3	2,500
52	176	20	196	98.0	300	600	0	0	800
53	217	30	247	114.0	300	400	1	2	600
54	141	8	149	111.8	250	400	1	0	600
55	114	61	175	84.0	300	400	1	1	600
56	74	6	80	28.2	200	300	0	0	500
57	140	12	152	79.3	400	600	0	1	1,000
58	117	15	132	68.9	500	600	0	1	1,000
59	75	10	85	40.8	800	400	3	5	1,200
60	40	1	41	24.6	300	300	0	1	400
61	49	8	57	36.0	400	600	1	2	1,200
62	80	12	92	48.0	500	600	1	2	1,600
63	8	1	9	4.5	200	400	2	0	600
64	112	50	162	108.0	200	300	1	0	400
65	142	60	202	134.7	500	600	0	0	1,000
(d) 66	0	0	0	0.0	0	0	0	0	0
67	120	11	131	82.7	300	600	0	0	400
68	20	214	234	117.0	400	500	0	0	1,000
69	57	4	61	40.7	300	400	0	0	600
70	62	7	69	41.4	400	400	0	7	800
(e) 71	4	0	4	2.1	50	50	0	0	200
72	90	15	105	52.5	500	300	2	11	1,200
73	104	6	110	55.0	400	300	0	8	800
74	132	20	152	82.9	500	400	1	4	800
75	80	4	84	53.1	500	300	0	2	600
76	54	3	57	31.1	1,000	400	1	2	1,200
77	105	0	105	66.3	400	500	0	3	800

(a) The tie rope on the bag became loosened during the drag.
(b) Net towed too rapidly, nothing taken but jellyfish.
(c) Several thousand very small crabs taken--no adults.
(d) Net caught in propeller, bag and catch lost.
(e) Bag split losing greater part of catch.

Table 2 - Catch for Each Drag, in Actual Numbers of Crab and Halibut and Estimated Pounds of Cod, Pollock, and Flounders

Drag No.	Crabs				Cod	Pollock	Halibut		Other Flounders
	Males	Females	Total	Pounds			Med.	Small	
BERING SEA (Cont.)									
78	19	1	20	10.0	400	300	0	1	600
79	93	2	95	67.1	500	400	0	1	200
80	71	0	71	44.8	600	400	0	3	500
81	200	0	200	120.0	500	400	1	8	700
82	291	4	295	168.6	300	100	2	2	500
83	91	2	93	65.6	300	200	0	2	400
84	155	0	155	77.5	300	100	1	13	400
85	126	0	126	48.3	300	100	1	0	400
86	52	0	52	19.5	400	100	3	2	500
87	135	1	136	62.8	300	100	1	9	400
88	77	0	77	28.0	300	50	0	7	400
89	108	1	109	54.5	200	50	2	1	400
90	108	2	110	60.0	300	50	1	1	500
91	142	0	142	53.3	200	25	0	5	400
92	48	0	48	22.2	200	50	0	3	400
93	96	1	97	52.9	300	400	1	0	1,000
94	56	11	67	28.7	600	800	5	8	1,400
95	64	3	67	33.5	300	900	1	2	600
96	150	5	155	77.5	600	500	2	2	1,400
97	41	0	41	21.4	25	0	1	0	100
98	185	3	188	75.2	300	200	1	4	400
99	23	0	23	11.5	100	50	0	0	100
100	193	2	195	70.9	400	200	1	5	700
101	204	0	204	94.2	200	100	1	2	400
102	121	0	121	51.8	300	100	0	1	500
103	46	0	46	21.2	50	25	0	0	100
104	17	0	17	8.5	200	50	1	2	150
105	51	1	52	26.0	300	100	1	1	800
106	17	0	17	10.2	500	300	1	5	1,400
107	27	1	28	19.8	250	50	2	1	600
108	98	0	98	56.0	200	50	0	0	400
109	214	0	214	95.1	300	150	0	0	1,000
110	237	0	237	94.8	300	100	1	1	800
111	178	0	178	85.4	200	50	0	1	600
112	54	0	54	22.3	150	50	0	1	200
113	291	0	291	99.8	500	200	1	6	1,500
114	122	0	122	61.0	300	50	2	4	600
115	73	1	74	32.9	200	50	2	1	500
(f)116	40	0	40	22.9	300	100	2	3	600
117	101	1	102	40.8	300	100	1	5	600
118	311	4	315	151.2	300	100	4	7	400
119	347	3	350	140.0	300	50	4	4	400
120	229	2	231	95.6	250	50	1	1	500
121	336	1	337	149.8	400	50	4	5	1,200
122	105	1	106	50.9	200	50	1	0	600
123	360	2	362	135.8	300	50	3	1	600
124	133	4	137	65.8	200	25	0	2	600
125	177	1	178	66.8	300	25	1	1	500
126	286	1	287	149.7	300	50	1	1	700
127	201	8	209	100.3	400	25	3	4	800
128	53	26	79	28.7	200	50	0	1	1,200
129	76	0	76	29.4	150	25	2	0	200
130	93	1	94	37.6	200	100	0	2	500
131	148	0	148	59.2	300	50	0	7	600
132	128	0	128	61.4	250	50	1	3	500
133	105	1	106	53.0	400	50	3	4	600
134	208	3	211	93.8	250	50	2	5	500
135	49	0	49	19.0	200	50	0	0	300
136	49	0	49	19.6	200	25	0	2	400
Sub Totals	13,332	840	14,172	52.9	42,800	37,925	98	336	75,385
SOUTH SIDE OF PENINSULA									
1	12	0	12	9.0	500	0	3	0	1,000
2	0	0	0	0.0	300	0	20	44	1,000
3	0	0	0	0.0	150	0	2	0	200
137	0	0	0	0.0	0	0	0	1	15
138	0	0	0	0.0	200	10	9	100	400
139	6	7	13	13.0	150	10	8	48	300
140	0	0	0	0.0	400	50	1	18	1,500
141	0	0	0	0.0	300	50	0	9	500
142	0	0	0	0.0	200	0	1	23	500
143	14	0	14	7.6	200	10	0	5	600
144	0	0	0	0.0	100	0	0	4	400
145	5	0	5	6.0	50	0	0	4	200
146	0	0	0	0.0	0	0	2	14	200
147	0	0	0	0.0	0	0	0	0	10
148	0	0	0	0.0	10	5	0	1	100
Sub Totals	37	7	44	2.4	2,560	135	46	271	6,525
Total	13,369	847	14,216	47.7	45,360	38,060	144	607	105,210

(f) In addition 100 small crabs returned to water.

Table 3 - Weight Distribution, in Pounds, of 100 Male King Crabs Taken in Drags 21, 33, 34 and 93, Bering Sea

Midpoint	Frequencies	Midpoint	Frequencies
4.00	1	9.25	1
4.25	-	9.50	7
4.50	-	9.75	1
4.75	-	10.00	2
5.00	1	10.25	4
5.25	2	10.50	4
5.50	4	10.75	2
5.75	9	11.00	5
6.00	-	11.25	1
6.25	2	11.50	4
6.50	-	11.75	2
6.75	2	12.00	6
7.00	5	12.25	4
7.25	4	12.50	3
7.50	4	12.75	3
7.75	2	13.00	-
8.00	3	13.25	1
8.25	1	13.50	-
8.50	4	13.75	1
8.75	3	14.00	-
9.00	2		

Table 4 - Size Distribution of 200 Male King Crabs Taken in Drags 7, 21, 36, 42 and 93, Bering Sea

Carapace Width (in inches)		Carapace Length (in inches)	
Midpoint	Frequencies	Midpoint	Frequencies
4.0	-	4.0	-
4.2	-	4.2	-
4.4	-	4.4	1
4.6	-	4.6	-
4.8	-	4.8	3
5.0	-	5.0	2
5.2	1	5.2	3
5.4	2	5.4	10
5.6	1	5.6	22
5.8	2	5.8	27
6.0	5	6.0	26
6.2	8	6.2	14
6.4	14	6.4	18
6.6	14	6.6	14
6.8	18	6.8	17
7.0	22	7.0	17
7.2	13	7.2	15
7.4	15	7.4	7
7.6	14	7.6	2
7.8	13	7.8	2
8.0	12	8.0	-
8.2	13	8.2	-
8.4	13	8.4	-
8.6	8	8.6	-
8.8	6	8.8	-
9.0	3	9.0	-
9.2	3	9.2	-
9.4	-	9.4	-
9.6	-	9.6	-
9.8	-	9.8	-
10.0	-	10.0	-

Table 5 - Size Distribution of 64 Female King Crabs Taken in Drags 53, 55 and 93, Bering Sea

Carapace Width (in inches)		Carapace Length (in inches)	
Midpoint	Frequencies	Midpoint	Frequencies
4.0	-	4.0	-
4.2	-	4.2	-
4.4	-	4.4	1
4.6	1	4.6	5
4.8	3	4.8	9
5.0	5	5.0	5
5.2	9	5.2	12
5.4	7	5.4	2
5.6	6	5.6	5
5.8	1	5.8	5
6.0	5	6.0	5
6.2	3	6.2	11
6.4	10	6.4	3
6.6	6	6.6	1
6.8	3	6.8	-
7.0	5	7.0	-
7.2	-	7.2	-
7.4	-	7.4	-
7.6	-	7.6	-
7.8	-	7.8	-
8.0	-	8.0	-

Table 6 - Size Distribution of all Halibut Taken in Bering Sea and South of the Peninsula.
Total Length Measurements in Centimeters.

Halibut(434) from Bering Sea		Halibut(317) from south of Peninsula		Halibut(434) from Bering Sea		Halibut(317) from south of Peninsula	
Midpoint	Frequencies	Midpoint	Frequencies	Midpoint	Frequencies	Midpoint	Frequencies
30	1	30	1	78	6	78	1
31	2	31	-	79	11	79	3
32	6	32	3	80	7	80	4
33	6	33	4	81	8	81	1
34	3	34	7	82	4	82	-
35	8	35	4	83	4	83	-
36	2	36	7	84	9	84	5
37	-	37	7	85	5	85	1
38	2	38	7	86	4	86	2
39	6	39	9	87	9	87	1
40	2	40	8	88	4	88	-
41	1	41	7	89	1	89	1
42	-	42	8	90	5	90	-
43	3	43	7	91	4	91	3
44	2	44	7	92	3	92	1
45	6	45	4	93	1	93	-
46	8	46	12	94	3	94	1
47	8	47	7	95	4	95	2
48	6	48	6	96	2	96	1
49	6	49	13	97	-	97	1
50	2	50	10	98	2	98	1
51	9	51	4	99	2	99	-
52	9	52	17	100	2	100	3
53	3	53	10	101	3	101	-
54	6	54	3	102	2	102	-
55	8	55	4	103	3	103	2
56	7	56	4	104	1	104	3
57	8	57	7	105	1	105	-
58	7	58	8	106	-	106	1
59	9	59	3	107	3	107	3
60	11	60	11	108	-	108	-
61	4	61	3	109	-	109	-
62	7	62	4	110	1	110	1
63	4	63	1	111	1	111	1
64	10	64	4	112	-	112	-
65	10	65	6	113	1	113	4
66	12	66	5	114	-	114	-
67	7	67	1	115	-	115	-
68	14	68	3	116	-	116	-
69	6	69	-	117	-	117	-
70	14	70	6	118	1	118	1
71	11	71	5	119	-	119	-
72	10	72	2	120	-	120	2
73	7	73	6	121	-	121	-
74	16	74	2	122	-	122	-
75	14	75	3	123	1	123	-
76	7	76	1			153	1
77	6	77	3			169	1
						170	-
						171	1

Table 7 - Size Distribution of 50 Cod (*Gadus macrocephalus*) Taken in Drag 17, Bering Sea. Standard Length Measurements in Centimeters.

Midpoint	Frequencies	Midpoint	Frequencies
30	1	54	-
31	1	55	1
32	1	56	-
33	-	57	1
34	2	58	1
35	-	59	-
36	-	60	-
37	-	61	1
38	2	62	-
39	2	63	-
40	4	64	-
41	5	65	-
42	1	66	-
43	5	67	-
44	4	68	3
45	1	69	-
46	2	70	1
47	1	71	1
48	-	72	2
49	-	73	2
50	1	74	-
51	2	75	2
52	-	76	-
53	-		

Table 8 - Size Distribution of 74 Pollack (Theragra chalcogramma) Taken in Drags 6 and 67, Bering Sea. Standard Length Measurements in Centimeters.

Midpoint	Frequencies	Midpoint	Frequencies
32.0	-	48.0	5
32.5	1	48.5	3
33.0	-	49.0	2
33.5	-	49.5	3
34.0	-	50.0	1
34.5	2	50.5	3
35.0	1	51.0	1
35.5	-	51.5	2
36.0	1	52.0	1
36.5	2	52.5	-
37.0	-	53.0	1
37.5	1	53.5	1
38.0	1	54.0	-
38.5	1	54.5	1
39.0	1	55.0	1
39.5	-	55.5	-
40.0	-	56.0	-
40.5	-	56.5	2
41.0	-	57.0	-
41.5	2	57.5	-
42.0	1	58.0	-
42.5	3	58.5	1
43.0	3	59.0	-
43.5	1	59.5	-
44.0	-	60.0	-
44.5	-	60.5	-
45.0	6	61.0	-
45.5	5	61.5	1
46.0	2	62.0	-
46.5	2	62.5	-
47.0	4	63.0	1
47.5	4	63.5	-

Table 9 - Size Distribution of 86 Yellow-fin Sole (Limanda aspera) Taken in Drag 13, Bering Sea and 50 Fish of the Same Species Taken in Drag 143 on the South Side of the Peninsula. Standard Length Measurements in Centimeters.

Bering Sea		South of Peninsula	
Midpoint	Frequencies	Midpoint	Frequencies
17.0	1	-	-
19.0	1	19.0	-
19.5	3	19.5	1
20.0	3	20.0	-
20.5	4	20.5	-
21.0	4	21.0	-
21.5	5	21.5	-
22.0	1	22.0	1
22.5	7	22.5	-
23.0	8	23.0	-
23.5	9	23.5	1
24.0	3	24.0	1
24.5	-	24.5	2
25.0	4	25.0	6
25.5	3	25.5	2
26.0	2	26.0	2
26.5	1	26.5	4
27.0	-	27.0	3
27.5	2	27.5	7
28.0	1	28.0	3
28.5	1	28.5	-
29.0	4	29.0	3
29.5	3	29.5	1
30.0	4	30.0	1
30.5	2	30.5	3
31.0	2	31.0	2
31.5	2	31.5	1
32.0	-	32.0	2
32.5	2	32.5	2
33.0	2	33.0	1
33.5	-	33.5	-
34.0	-	34.0	1
34.5	1	34.5	-
35.0	1	35.0	-

Note: Av. wt. = 1.045 lb.

Table 10 - Size Distribution of 44 Flathead Sole (Hippoglossoides elassodon) Taken in Drag 143, South of the Peninsula. Standard Length Measurements in Centimeters.

Midpoint	Frequencies	Midpoint	Frequencies
16.0	-	28.0	-
16.5	2	28.5	1
17.0	-	29.0	1
17.5	-	29.5	1
18.0	-	30.0	-
18.5	-	30.5	4
19.0	-	31.0	2
19.5	-	31.5	4
20.0	2	32.0	3
20.5	-	32.5	1
21.0	1	33.0	1
21.5	2	33.5	-
22.0	1	34.0	2
22.5	1	34.5	1
23.0	1	35.0	1
23.5	-	35.5	1
24.0	-	36.0	-
24.5	-	36.5	-
25.0	2	37.0	1
25.5	1	37.5	1
26.0	1	38.0	-
26.5	-	38.5	-
27.0	1	39.0	1
27.5	3	39.5	-

Note: Av. wt. = 1.04 lbs.

Table 11 - Size Distribution of 50 Rock Sole (Lepidopsetta bilineata) Taken in Drag 19, Bering Sea. Standard Length Measurements in Centimeters

Midpoint	Frequencies	Midpoint	Frequencies
17.0	-	28.0	1
17.5	-	28.5	2
18.0	2	29.0	1
18.5	2	29.5	2
19.0	-	30.0	2
19.5	1	30.5	1
20.0	1	31.0	-
20.5	4	31.5	1
21.0	2	32.0	-
21.5	3	32.5	1
22.0	1	33.0	-
22.5	4	33.5	1
23.0	4	34.0	-
23.5	3	34.5	-
24.0	3	35.0	-
24.5	-	35.5	-
25.0	2	36.0	1
25.5	1	36.5	-
26.0	1	37.0	1
26.5	-	37.5	-
27.0	2	38.0	-
27.5	-	38.5	-

Note: Av. wt. = 1.04 lbs.

Table 12 - Size Distribution of 19 Lemon Sole (Pleuronectes quadrituberculatus) Taken in Drag 118, Bering Sea. Standard Length Measurements in Centimeters.

Midpoint	Frequencies	Midpoint	Frequencies
21.0	1	31.5	-
21.5	-	32.0	-
22.0	-	32.5	1
22.5	-	33.0	-
23.0	1	33.5	3
23.5	-	34.0	-
24.0	-	34.5	1
24.5	-	35.0	-
25.0	-	35.5	-
25.5	-	36.0	1
26.0	-	36.5	-
26.5	-	37.0	-
27.0	-	37.5	-
27.5	-	38.0	3
28.0	-	38.5	-
28.5	1	39.0	-
29.0	1	39.5	-
29.5	3	40.0	-
30.0	1	40.5	-
30.5	-	41.0	1
31.0	1	41.5	-

Note: Av. wt. = 1.88 lbs.

Table 13 - Size Distribution of 34 Herring (Clupea pallasii) Taken in Drag 18, Bering Sea. Standard Length Measurements in Centimeters.

Midpoint	Frequencies	Midpoint	Frequencies
22.0	-	26.5	6
22.5	1	27.0	5
23.0	1	27.5	3
23.5	-	28.0	1
24.0	1	28.5	-
24.5	3	29.0	3
25.0	-	29.5	2
25.5	2	30.0	-
26.0	6	30.5	-

Table 14 - Air, Water Surface and Bottom Temperatures in Degrees Centigrade Taken on the Fishing Grounds in Bering Sea and South of the Peninsula.

Date	Drag	Area*	Depth (Fathoms)	Temperatures			Locality
				Air	Surface	Bottom	
July 31,1947	2	54-165,5C	38	9.3	6.8	5.70	Akun Bay
Aug. 1, 1947	4	54-165,4C	82	8.5	7.5	3.76	10 M. N. Akun Island
2	7	56-162,4A	41	8.5	8.5	3.60	45 M. NW Black Hills
2	9	56-162,4C	39	8.3	8.7	4.00	" " " " "
3	12	56-162,3F	40	10.3	8.7	4.25	50 M. N. " "
4	17	56-160,3B	32	10.0	8.7	7.25	30 M. NNE Nelson Lagoon
4	18	56-161,5A	41	11.5	10.3	3.33	" " N. Black Hills
5	22	56-162,6A	46	12.5	8.5	1.95	35 M. NW " "
5	24	55-162,1D	35	17.0	12.8	4.18	20 M. WNW " "
5	26	55-162,2D	21	14.6	12.8	8.75	10 M. W. " "
7	27	58-161,6D	24	12.5	10.3	5.30	30 M. S. Cape Pierce
7	28	58-162,3E	25	9.3	12.0	9.4	8 M. W. Cape Newenham
8	29	56-164,4B	50	9.8	10.1	1.65	90 M. N. Unimak Island
8	32	56-163,3B	46	12.3	10.8	1.95	" " " " "
8	35	56-163,2F	42	11.4	10.3	2.35	75 M. N. Amak Island
9	38	56-162,2B	39	11.8	10.3	3.08	65 M. NNW Black Hills
9	41	56-162,1E	44	10.3	10.6	3.01	70 M. N. " "
11	47	56-162,1F	45	10.3	9.9	3.22	" " " " "
12	53	56-161,1A	44	10.8	10.0	3.15	" " " " "
14	64	56-161,2B	37	11.5	10.3	3.75	60 M. N. " "
16	75	56-162,2F	42	9.8	10.3	3.95	" " " " "
23	93	56-162,4F	51	12.4	10.8	3.95	40 M. N. " "
25	103	56-162,5D	42	10.8	10.6	3.66	35 M. NNW " "
30	123	56-161,3B	43	9.6	10.3	4.28	40 M. NNW Nelson Lagoon
Sept.6, 1947	137	54-164,4F	51	9.2	8.8	4.41	Unimak Bight
6	138	54-163,3A	25	9.4	8.7	5.98	" "
6	140	54-163,2E	45	10.6	6.9	4.63	Ikatan Bay
7	142	55-163,6F	15	8.6	7.0	6.48	Morzhovoi Bay
8	143	55-161,5B	61	7.8	6.2	3.96	Outer Pavlof Bay
8	146	55-160,6B	31	9.5	8.6	7.36	Acheredin Bay
9	147	55-160,4D	76	9.7	8.5	4.53	Between Papof & Korovin Islands

* As designated on special chart in use by the Alaska Fishery Investigation; a portion of which is reproduced in Fig. 1.

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